

CRUISE REPORT FROM R/V ARGOS

Survey period: 20010115-20010121

Survey area: The Skagerrak, the Kattegat,
the Sound, and the Baltic Proper

Principal: SMHI

SUMMARY

The expedition was performed within SMHI's regular marine monitoring programme and covered the Skagerrak, the Kattegat, the Sound, and the Baltic Proper.

Mapping of winter nutrient conditions in the Kattegat and the Sound was performed.

Temperature as well as nutrient conditions in the surface layer were normal for the season in all areas except some temperatures in the Baltic, which were higher.

In the Baltic oxygen concentration of the bottom water usually was lower than the mean value of the latest decade.

Oxygen concentrations below 2 ml/l was generally found from 70 to 80 metres in the Baltic, in the western Gotland Basin however from 90 m.

The area of hydrogen sulphide was not so extended as during last expedition. An inflow of oxygenous saline water contributed to that no hydrogen sulphide could be detected at Christiansö or in the Bornholm Deep. Hydrogen sulphide was not found in the Karlsö Deep either. In return it was found from 125 m in the eastern Gotland Basin, in the northern and northwestern Baltic.

PRELIMINARY RESULTS

The expedition, which was a part of the SMHI ordinary monitoring programme, began in Göteborg on the 15th of January and ended in the same place on the 21st. Mapping of winter nutrient conditions in the Kattegat and the Sound was performed. A position of high pressure was prevalent and the first days the weather was almost calm. Then a weak southeasterly wind was predominant. In spite of the high pressure the weather was nearly always cloudy.

The Skagerrak

Surface water temperatures varied between 4.0°C and 5.7°C. The lower temperature was measured at P2 and the higher at Å14. At Släggö, the station that is situated near the coast, ice had started to form and the temperature was different to the others. Here it was 1.6°C.

The winter values of phosphate and nitrate had almost normal levels, 0.55-0.60 µmol/l and 6-8 µmol/l respectively. At Släggö, still aberrant, high nitrate (16), ammonia (2) and silicate (30 µmol/l) concentrations were shown in the surface water.

The Kattegat and the Sound

Surface water temperatures varied between 3.3°C and 4.7°C. These data of the lower and upper limit were measured at W Landskrona and GF6 respectively. Furthermore there was an extreme value of 6.17°C in the Ålborg bugt.

The thermo- and haloclines, which were situated at 15-20 metres, were obvious in the Sound and along the Swedish and Danish coast, while they were missing in the centre of the Kattegat. Lower oxygen saturation had water from depths greater than 15 metres in the Sound and at Kullen. Thus W Landskrona had at 20 metres 63%, which corresponds to 4.1 ml/l. This was a somewhat lower value than the latest decade mean variation.

The winter level of nutrients was within normal variation.

The winter nitrate concentration of the surface varied between 4 and 11 µmol/l, where the higher values were to be found in the western Kattegat, in Laholmsbukten and at Kullen and the lower at Anholt E and in the southern Sound. The level of the corresponding phosphate values was 0.5-0.9 µmol/l. Here as well the concentrations were highest in the western Kattegat and lowest at Anholt E.

The Baltic Sea

Surface water temperatures varied between 4.4°C and 5.9°C. The lowest temperatures were registered in the southern Baltic and on the Landsort Deep and the highest in Northeast at the station BY29. This station together with the western and eastern Gotland Basin had a higher temperature than the mean variation of the latest decade.

The temperature in the southern Baltic was higher with increased depth, while in the rest of the Baltic the temperature had a minimum at 60-70 metres.

At Christiansö and in the Bornholm Deep at 70-80 metres below the thermo- and halocline the oxygen concentration was <2 ml/l with exception of the depth near the bottom, where an inflow of

oxygenous saline water had displaced the hydrogen sulphide. Hydrogen sulphide had also disappeared from the Karlsö Deep. Also in the rest of the Baltic the oxygen concentration was less than 2 ml/l from 70-80 m, in the western Gotland Basin, however, from a depth of 90 m.

Presence of hydrogen sulphide was estimated from 125 metres in the eastern Gotland Basin (BY15 from 150 m), in the northern Gotland Basin (BY29 from 100 m) and in the western at BY32. In addition hydrogen sulphide was present in the bottom water in the Hanö Bight. In most sampling stations the oxygen concentration (positive or negative) of the bottom water was lower on comparison with the mean values of the latest decade.

Winter values of nutrients were within or near the normal variation.

The phosphate concentration of the surface water was 0.35-0.60 $\mu\text{mol/l}$, where the highest values were found in the Bornholm Basin and in the Hanö Bight. The nitrate concentrations had been more than doubled since December in the southern and southeastern Baltic and were now on a level between 2.5-4 $\mu\text{mol/l}$. High concentration was to be found at the Landsort Deep and in the Hanö Bight, low at the Bornholm and Gotland Deep.

PARTICIPANTS

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APPENDICES

- Track chart
- Table over stations, parameters and sampling depths
- Map showing bottom oxygen concentrations
- Monthly average plots for selected stations
- Profiles for selected stations